Personal contact information:

Name: Fabio Immovilli

Affiliation: University of Modena and Reggio Emilia, Italy

DISMI - Department of Sciences and Methods for Engineering

Role: Associate Professor of Power Electronic Converters, Electrical Machines and Drives

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Education:

PhD in Industrial innovation engineering - University of Modena and Reggio Emilia - 24/02/2011

MS in Industrial engineering - University of Modena and Reggio Emilia - 19/12/2006

Short Biography

Fabio Immovilli received the M.S. degree and the Ph.D. in Industrial Engineering at the University of Modena and Reggio Emilia in 2006 and 2011 respectively. In 2009, he was a Visiting Scholar at the Power Electronics, Machines and Control Group of the University of Nottingham, Nottingham, UK.

From Nov 2010, until Oct 2016 he was Project manager and Inside director at Raw Power Srl, a spin-off company of the University of Modena and Reggio Emilia specialized in power electronic design. In 2016, he joined the University of Modena and Reggio Emilia, Reggio Emilia, Italy, as an Assistant professor in Electric Converters. Since November 2019 he is Associate Professor in Electric Converters, Machines and Drives at the Department of Sciences and Methods for Engineering.

Since November 2024 he is Chair of the Mechatronic Engineering Programme, responsible for the Bachelor and MS Degrees in Mechatronic Engineering.

He is lecturer of the following courses: “Static Energy Conversion - A course on power converters”, “Inverter and Electrical Machines for the Industry”, “Advanced electric drives and power converter systems”.

His research interests include electric machine diagnosis, power converters, machines for energy conversion from renewable energy sources and thermoacoustics. He holds two international industrial patents. He is author or co-author of more than 72 papers published in the proceedings of international conferences, journals and transactions. Scopus h-index: 17

Main Research activities with associated dates from 2007 to 2025

Fabio Immovilli's main research activities concern the non-invasive diagnosis of electric machines health condition, energy production and conversion from renewable energy sources and thermoacoustic machines and converters. The research topics covered led to the development of analytical methodologies and the creation of prototypes for experimental investigation and validation. More in detail, the activities can be subdivided into the following research categories:

1. Techniques for indirect measure of electromechanical faults and condition monitoring in electric machines, together with accelerated life testing of the insulation degradation.

2. Numerical Simulation and experimental characterization of power converters and their control

3. Micro-inverter architectures for applications in renewable sources exploitation (photovoltaic and wind power systems). Development of high efficiency bidirectional converter architectures for energy storage applications with wide input / output voltage ratio.

5. Finite Element Simulation of electrical machines Linear alternators and transducers for thermo-acoustic converters.

The research activities of Fabio Immovilli started in 2007, developing a test bench for electric machine characterization and fault condition modeling, developed employing dSpace 1104 control platform.

Since 2008 he works in the field of electric machines diagnosis for the non-invasive detection of electro-mechanical faults, especially of bearings and rotor bars. This research item was the main topic of his Ph.D Thesis in Industrial Innovation Engineering.

In 2009, he was a Visiting Scholar at the Power Electronics, Machines and Control Group of the University of Nottingham, Nottingham, UK. He worked at the SCORE project: a simple, reliable, thermoacoustic driven generator for developing countries.

In 2010-2011 he worked at the development of a concentrated photovoltaic collector, based on III-IV multijunction solar cells, and associated test bench for accelerated thermal stress induced failures of interconnection and cell bonding to the microchannel cooled DBC mounting substrate.

In 2012 he worked together with the research group of Prof. S.B. Lee of Korea University in the identification of diagnostic indexes for rotor faults in Double Cage Induction Machines.

From 2012 to 2015 he worked in the development of a diagnostic index for the evaluation of stator faults in multiphase PM machines.

In 2012-2013 he was one of the researchers in the Project PRIN 2009 (national competitive funding) entitled "High Reliability Multiphase Electric Drives for More Electric Aircraft Applications", national coordinator Prof. Alberto Tenconi.

Since 2013 he works on a new topology and Space vector modulation strategy for Grid-Connected Current Source Inverter, named CSI7, dedicated to grid-tied photovoltaic systems, aiming at increasing converter efficiency and mitigating ground leakage current.

Since 2018 he works on multi-three-phase machines control and design, aimed at the electrification of non-road vehicles and inland waterways vessels.

In 2021 started a new research topic in the wireless power transfer using inductive coupling, aimed to industrial and aerospace applications, research results were first published in 2024.

The research results of the aforementioned activities were published on IEEE proceedings and IEEE Journals.

Teaching Activity

Since Nov. 2016, Fabio Immovilli is an Assistant professor in Electric Converters, Machines and Drives at the University of Modena and Reggio Emilia, Italy. He is lecturer of the following courses: “Electrical engineering”, “Static Energy Conversion - A course on power converters” and “Electric drives - Electric propulsion systems”, “Electric Drives Laboratory”, “Advanced electric drives and power converter systems”.

- “Static Energy Conversion - A course on power converters” (3 CFU, 27 hours of lecturing), at the University of Modena and Reggio Emilia from A.Y. 2012/2013 until A.Y. 2018/2019 (6 years).
- “Static Energy Conversion - A course on power converters” (6 CFU, 54 hours of lecturing), at the University of Modena and Reggio Emilia from A.Y. 2019/2020 until now
- “Electrical Engineering”, (6 CFU, 54 hours of lecturing), at the University of Modena and Reggio Emilia, from A.Y. 2016/2017 until A.Y. 2021/2022.
- “Electric drives - Electric propulsion systems” (6 CFU, 60 hours of lecturing, entirely taught in English), at the University of Modena and Reggio Emilia, from A.Y. 2017/2018 until A.Y. 2018/2019 (2 years).
- “Electric drives laboratory” (6 CFU, 54 hours of lecturing), at the University of Modena and Reggio Emilia, from A.Y. 2020/2021 until A.Y. 2022/2023.
- “Inverter and Electrical Machines for the Industry” (6 CFU, 54 hours of lecturing), at the University of Modena and Reggio Emilia, from A.Y. 2023/2024 until now.
- “Advanced electric drives and power converter systems” (6 CFU, 54 hours of lecturing, entirely taught in English), at the University of Modena and Reggio Emilia, from A.Y. 2022/2023 until now.

Fabio Immovilli is one of the faculty advisor of Project RED a learning by doing team focused on designing, building and operating planetary exploration rovers to participate in international competitions, such as the European Rover Challenge.

Fabio Immovilli was the supervisor of more than 60 among BS and MS degree thesis at the University of Modena and Reggio Emilia.

PhD Activity

Since February 2018 he is a member of the PhD Program Committee for the PhD course “Automotive Engineering for Intelligent Mobility”.

Supervisor of the Ph.D. candidate: Ciro Alosa (2019-2022)

With reference to research topics on power electronic converters, electric machines and drives, he has taken part to PhD juries for: University of Bologna, Italy; University of Padua, Italy ; Polytechnic of Turin, Italy; University of Nottingham, UK; University of Nottingham - Ningbo, CHINA

Publications

Since 2008 Fabio Immovilli publishes regularly on IEEE Conferences Proceedings and Journals with peer review. For an up-to date detailed list of papers, please refer to the author’s publication database profiles:

Scopus profile: https://www.scopus.com/authid/detail.uri?authorId=25122528400.

Google Scholar profile: https://scholar.google.it/citations?user=h1crbN4AAAAJ&hl=en

Fabio Immovilli is co-inventor of one industrial patents, related to direct-drive pick&place robot actuation.

P. Mignano, F. Immovilli, “A DEVICE FOR HANDLING AND/OR PERFORMING WORK OPERATIONS ON OBJECTS”, WO2009069154 (priority WO2007IT00821 20071126).

Editorial and Peer review activity

From April 2017 until June 2020 Fabio Immovilli was Associate editor for the Canadian Journal of Electrical and Computer Engineering.

Fabio Immovilli is currently Associate editor for the IEEE IAS IDC committee since March 2022 and IEEE IAS IPCC committee since January 2023 respectively.

He also is a regular reviewer for the following journals:

IEEE Transactions on Industrial Electronics, IEEE Transactions on Magnetics, IEEE IAS Electric Machines Committee, IET Electric Power Applications, IET Renewable Power Generation, Experimental Techniques

A complete list overview of the peer review activity can be found at: www.publons.com/a/1366736/

Moreover, he is reviewer for the IEEE conferences organized by the Industry Application Society and the Industrial Electronics Society, such as: IEEE ECCE, IEEE IECON and IEEE SDEMPED.

Fabio Immovilli served as session chair in the following IEEE conferences:

Session co-chair at SDEMPED 2011- 8th IEEE International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives - Bologna, Italy Sept. 5-8 2011.

Session chair for Oral Session TT02 8 - Power Electronics I at IEEE IECON 2013, 39th Annual Conference of the IEEE Industrial Electronics Society - Vienna, Austria Nov. 10-13 2013

Session chair for Oral Session TTE–EM 2 at IEEE IECON 2016, 42nd Annual Conference of the IEEE Industrial Electronics Society - Florence, Italy Oct. 24-27 2016

Session chair for Oral Session Session 7B Reliability of Fuel Cells, Batteries, and OLEDs at IEEE SDEMPED 2019, 12th IEEE International Symposium on Diagnostics for Electrical Machines - Tolouse, France Aug. 27-30 2019

Session chair for Oral Session TTE–EM 2 at IEEE IECON 2019, 45th Annual Conference of the IEEE Industrial Electronics Society - Lisbon, Portugal Oct. 14-17 2019

Session chair for Oral Session FA1 - Railways Drives and Systemsat IEEE SPEEDAM 2020, International symposium on power electronics, electrical drives and Motion – Virtual meeting Jun. 24-26 2020

Session chair for Oral Session Electrical Machine Design and Modelling 02 at IEEE WEMDCD 2021, 5th IEEE Workshop on Electrical Machine Design, Control and Diagnosis - Virtual conference 8-9 APRIL 2021

Session chair for Oral Session in the International Conference on System Reliability and Safety (ICSRS2023) held in November 22-24, 2023 in Bologna - Italy

Fabio Immovilli is IEEE senior member, and member of the following societies: IEEE Industrial electronics Society, IEEE Power & Energy Society, IEEE Industry Applications Society, IEEE Transportation Electrification Committee, IEEE Electric Machines Committee. Also, the Italian association "Electric converters, machines and drives research group" acronym "CMAEL" http://www.cmael.eu/

Reggio Emilia, 19-01-2026

Fabio Immovilli